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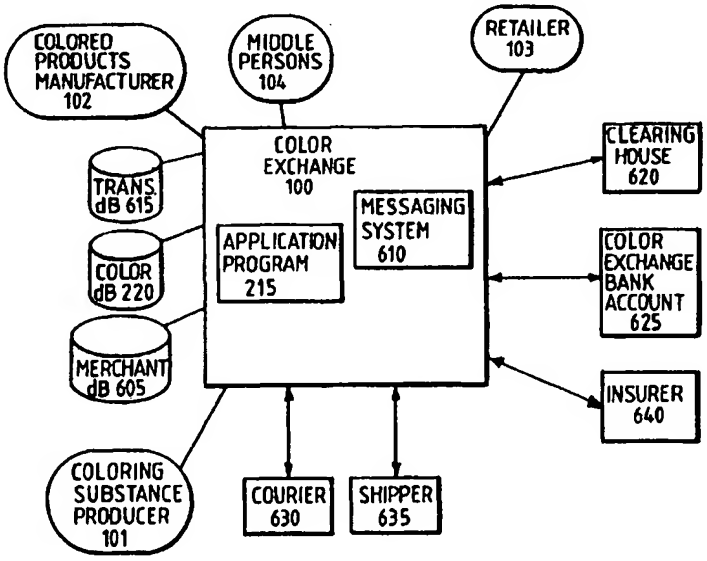

(57) Abstract: A system and method for selling coloring substances is presented herein. An application program for converting spectrophotometer measurements at client computers to color space coordinates is placed on a server. Spectrophotometer measurements are transmitted to the application program over a client/server connection. The application program converts the spectrophotometer measurements into a color space coordinate and stores records catalogued by the color space coordinate in a database at the server. Storage of color space coordinates of coloring substances at the server facilitates pairing of potential buyers and sellers. Additionally, storage of color space coordinates at the server also results in a larger number of records, thereby permitting greater flexibility in recipe calculations.

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ONLINE COLOR EXCHANGE

The present invention relates to color physics, and more particularly, to a system for accurately communicating color needs and supplies over an electronic media.

The development of a worldwide standard of weights and units of measurement greatly facilitates transnational commerce. A seller can measure a fabric using a scale or ruler that is universally accepted and can quantitatively describe the fabric as weighing 100 kgs or being 3000 meters long. Thus, the buyer will know the precise quantity of the fabric without having to physically examine the fabric. Alleviating the buyer from physically examining the fabric significantly reduces transaction costs and permits transactions between parties which are separated by vast distances.

However, the description of colors is more complex. Although simple color descriptions, such as red or blue,

give a general idea of the color, the foregoing are too imprecise in many commercial contexts. Where a precise color description is required, colors are communicated by means of physical samples which are examined by the parties. The transferring of a physical sample from one party to another can greatly increase the time required to complete a transaction, even where the physical sample is sent by an overnight courier.

A common practice in the textile industry is the use of swatch booklets. Dyestuff suppliers provide a booklet of sample fabrics that have been dyed by each of the supplier's available dyes to various purchasers. When a dyestuff user (dyehouse) wishes to assess the color that can be created by use of the dyestuff in a particular concentration on a particular substrate, the dyestuff user may view the swatch showing the combination nearest to that desired. Providing the purchasers with swatch booklets permits faster recipe creation and, therefore, improved customer service. Despite the benefits of swatch booklets, there are also a number of disadvantages. Swatch booklets are costly to produce and are not susceptible to copying, thereby increasing marginal costs. Additionally, the dyestuff supplier must distribute the swatch booklets to each of their customers and potential customers. In many cases, the customers are located all around the world, and such distribution can entail a

considerable lag time. Furthermore, the swatch booklets must be updated or replaced with each additional dye that is created. Due to the expense and lag times associated with the swatch booklets, dyestuff users (dyehouses) are often discouraged to make changes in their dyes. Swatches may also be used for the sale of colored products, such as fabrics, or yarns. When a purchaser wishes to purchase a particular color of fabric or yarn, the purchaser simply identifies the particular color from the swatch book and notifies the colored product manufacturer (fabric or yarn dyehouse).

Although there are a number of ways to transfer colors electronically, electronic color transfer is currently imprecise. For example, a color can be communicated from one party to another by optically scanning a sample of the color and electronically transmitting a digital representation of the color over a communication medium to a computer monitor or a printer. The transfer of the digital representation is almost instantaneous and use of the internet or public switched telephone network permits transfer to virtually anywhere in the world. However, the digital representation must be in accordance to a predetermined standard that is understood by both the optical scanner and the output device. Where the optical scanner and the output device are separated by vast

distances, it is possible that the optical scanner and the output device use different standards. Additionally, the digital representation that is generated is based on lighting, the substrate that is colored, as well as the calibration parameters of the optical scanner. The appearance of the color on the output device is based on calibration parameters of the output device.

The CIE 1976 L*a*b* color space is the most widely used method for measuring object color. The CIE 1976 L*a*b* is a mathematical model describing color sensations and is based on the color describing theory of opponent colors. The method of describing colors by an opponent-type system follows the idea that somewhere between the eye and brain, information from cone receptors in the eye gets coded into light-dark, red-green, and yellow-blue signals. The concept follows that colors can be considered as combinations of red and yellow, red and blue, green and yellow, and green and blue. One advantage of the CIE 1976 L*a*b* standard is that differences between colors agree consistently well with visual perceptions of the differences.

The digital representation of a color that is generated by an optical scanner is dependent on various factors such as the substrate that is colored and the lighting. Accordingly, an optical scanner can digitally represent the perceived color. In contrast, a spectrophotometer is a

device which exposes a colored substrate to a series of lights with differing predetermined wavelengths and measures the degree of reflectance for each wavelength. Accordingly, the spectrophotometer measures the "true" color, as opposed to the perceived color.

Although the spectrophotometer measures the true color properties, the results of a spectrophotometer vary considerably depending on calibration parameters.

The present invention is directed to a system and method for an on-line color physics web site which defines a standardized color universe for defining all of the colors in the visible spectrum. A spectrophotometer at the client computer under the control of a software program at a server computer creates a digital representation of an input coloring substance as it would appear in known concentrations on known substrates or a colored product. A data structure at the server computer stores the digital representation and is accessible worldwide.

FIGURE 1 is a block diagram of a color exchange;

FIGURE 2 is a block diagram of a high-speed communication network configured to facilitate the color exchange;

FIGURE 3 is a block diagram of a color space;

FIGURE 4 is a block diagram of a system for inputting the color of a sample;

FIGURE 5 is a block diagram of an exemplary histogram;

FIGURE 6 is a block diagram of the color exchange system configured to facilitate the sale and purchase of coloring substances and colored products; and

FIGURE 7 is a flow diagram describing the operation of the color exchange.

Referring now to FIGURE 1, there is illustrated a block diagram of a color exchange 100. The color exchange 100 links members of a colored products supply chain. Members of the colored products supply chain include producers 101 of dyes, paints, and other substances used for coloring (now referred to as coloring substances), product manufacturers 102 which use the coloring substances to color various products (now referred to as colored products), colored products assemblers 103 who assemble the colored products into end products, and any number of middlepersons 104 leading to retailers. Coloring substance producers 101 can

include, for example, dye stuff warehouses, and paint makers. Colored product manufacturers 102 can include, for example, a fabric dyer, a dyehouse, an auto parts maker, and a molded plastic manufacturers. A colored products assembler 103 can include, for example, garment manufacturers and auto manufacturers. A seller, which can include any of the foregoing parties, can communicate their inventory of available coloring substances or colored products for sale. A buyer, which can also include any other foregoing parties, can communicate the coloring substances or coloring products which are sought for purchase. The information regarding the colors sought and for sale is classified and catalogued within a predetermined color measurement and description standard known as a color space. Accordingly, buyers seeking to buy and sellers seeking to sell a particular coloring substance or colored product can instantaneously communicate the color and locate buyers and sellers to secure a transaction.

By centralizing the colors sought and for sale, the color exchange 100 alleviates substantial transaction costs. For example, the sellers are alleviated from costs associated with dissemination of information of the goods that sellers have to sell. The buyers are alleviated from having to contact each seller to review their inventory. By reducing transaction costs, the color exchange 100 increases

the liquidity of the market for the coloring substances. To further increase the liquidity of the market for the coloring substances and colored products, high speed communication must occur between the buyers and sellers and the color exchange 100.

Referring now to FIGURE 2, there is illustrated a block diagram of a high-speed communication network, referenced generally by the numeral designation 200, for facilitating the color exchange 100 described in FIGURE 1. The computer network 200 comprises at least one server 205 and any number of client computers 210. A server 205 is a computer which centralizes various resources for usage by any number of client computers 210. The resources centralized by the server 205 can include, for example, application program 215 and databases 220. Additionally, the server 205 can provision email service for the client computers 210. The application program 215 comprises a series of executable instructions stored in memory at the server 205 and is preferably a multi-user program which can be simultaneously used by large numbers of client computers 210.

The client computers 210 access the centralized resources by establishing an input/output connection with the server 205, known as a client/server connection. The client/server connection is established by means of a communication channel 225. The communication channel 225

includes any combination of communication media, such as, but not limited to, a coaxial cable, a fiber optic link, a wireless radio link, or a connection within the public switched telephone network. Another type of communication media is known as the Internet. The Internet comprises any number of local area networks (LANs) and wide area networks (WANs), from corporations, educational institutions, the military, and government agencies from around the world, connected together by means of high capacity data links.

In many cases, the client computer 210 and the server 205 are both directly connected to the Internet. The client computer 210 and server 205 communicate by addressing and sending data packets in accordance with the protocols of the Internet, thereby establishing client/server connections. Alternatively, the client computer 210 can establish a connection using connection media (usually a connection within the public switched telephone network) with an internet port known as an internet service provider (ISP) and then use the internet to establish a connection from the ISP to the client computer 210.

The color exchange 100 can be associated with the server 205 while the each member of the colored product supply chain, 101, 102, 103, 104 can access the color exchange 100 via client computers 210. Implementation in the foregoing manner allows for instantaneous communication

between the buyers and sellers and the color exchange 100. Additionally, the centralized nature of server 205 permits storage of information regarding the sellers' inventories and the buyers' demands in the remotely accessible database 220. The server 205 is preferably directly connected to the internet, and at least a major component of the communication channel comprises the internet, thereby permitting access from client computers 210 located virtually anywhere in the world.

The high speed communication network 200 permits rapid and efficient communication between buyers and sellers. Notwithstanding high speed communications, one of the primary problems encountered in any transnational commerce between buyers and sellers is the buyer's inability to examine the goods being purchased prior to closing the transaction. It is not until the buyer actually receives the goods that the buyer can actually ascertain their acceptability. Partially alleviating the aforementioned problem is the development of a worldwide standard for weights and units of measurement. A seller can measure a fabric using a scale or ruler that is universally accepted and can quantitatively describe the fabric as weighing 100 kgs or being 3000 meters long. Thus, the buyer will know the precise quantity of the fabric without having to physically examine the fabric.

However, the description of coloring substances or colored products in the seller's possession in a manner that the buyer can properly evaluate is considerably more complex. Simple color descriptions such as red, blue, etc., are not sufficiently precise for many industrial applications. For example, a color products assembler 103, such as a garment manufacturer 103, may seek to purchase a set of zippers and sewing threads from colored products manufacturers 102, to apply to a certain material to make a garment. The garment manufacturer 103 must purchase zippers and sewing threads that are matching within a certain small degree of tolerance to the color of the material. In order for the garment manufacturer 103 to approve and purchase such zippers and sewing threads, the garment manufacturer 103 must be able to communicate the color sought and understand the color of the zippers and sewing threads produced by the colored products manufacturer 102.

Referring now to FIGURE 3, there is illustrated a block diagram of a color space, referenced generally by the numeral designation 300, for describing a color. The most widely used color space 300 is known as the CIE 1976 L*a*b* color space. The CIE 1976 L*a*b* is a mathematical model describing color sensations and is based on the color describing theory of opponent colors. The concept follows that colors can be considered as combinations of red and

green, yellow and blue, and black and white. One advantage of the CIE 1976 Lab is that the differences between colors agree consistently well with visual perceptions of the differences. A given color is associated with a series of parametric measurements measuring red/green factor, blue/yellow factor, and black/white factor. These measurements uniquely describe the color and can be represented as a point in a three-dimensional color space 300, where the red/green parametric measurement is plotted as point on a red/green axis 305a, where the blue/yellow parametric measurement is plotted as point on a blue/yellow axis 305b, and where the black/white parametric measurement is plotted as point on a black/white axis 305c.

The information regarding a seller's inventory or a buyer's demands can be communicated using the foregoing color space 300. Additionally, this information can be catalogued and stored as records in a data structure emulating the color space 300 in database 220. The foregoing data structure would sort and allow such records to be searched by the visual appearance of the colors.

Referring now to FIGURE 4, there is illustrated a block diagram of a system, referenced generally by the numeral designation 400, for inputting the color of a sample 402 into an on-line database containing a data structure emulating a color space, such as database 220. The sample

402 can either have the color of a coloring substance or colored product in the seller's inventory or the color of a coloring substance or colored product sought for match by the buyer. The system includes a spectrophotometer 405 attached to client computer 210.

It is noted that colors can appear different based on surrounding light and the substrate. Additionally, different colors can appear the same, based on the surrounding lighting and substrate. The foregoing effect is known as metamerism. The spectrophotometer 405 conducts wavelength reflection tests on the sample 402. The wavelength reflection tests on the sample 402 produce results that are indicative of the color, independent of surrounding lighting. Additionally, if the spectrophotometer conducts wavelength reflection tests separately on a colored sample and an uncolored sample of a substrate, the effects of the substrate can be mathematically separated to give the results for the effect of the coloring substance alone.

Referring now to FIGURE 5, there is illustrated a block diagram of a histogram, referred to generally by the reference numeral 500. The histogram 500 includes a horizontal axis 505 measuring the wavelengths 510 of light. The spectrophotometer 405 shines light of predetermined intensity for each of the wavelengths 510 (usually 32 different wavelengths uniformly spread about the visible

spectrum) at the sample 402. The intensity of the light that is reflected from the sample 402 is measured by the spectrophotometer 405 and the intensity of light reflected from a sample 402 as a percentage of the intensity of the light shined on the sample 402 are represented by plots 515 against vertical axis 518. Exemplary measurements of the intensity of light reflected from a sample 402 as a percentage of the intensity of the light shined on the sample 402 are represented by plots 515. A collection of the coordinates of the plots 515 comprise a histogram record.

With further referenced to FIGURE 4, the histogram record for the sample 402 is provided to the application program 215. The application program 215 performs mathematical transformations which translate the histogram record into a record based on the three-dimensional color space of the CIE 1976 L*a*b standard. It is noted that although the CIE 1976 L*a*b standard is the most widespread, other color standards can also be used. The histogram record is output to the database 220 for storage. The CIE 1976 L*a*b standard parametric measurements under one standard light source is used as a sorting index in the database 220 for the histogram record to facilitate searches. Additionally, the application program 215 can calculate the CIE 1976 L*A*B* standard parametric measurements of the resulting color from known concentrations of the color

substance on the sample 402 being applied to certain known substrates.

It is noted the computers, such as the server 205 and client computers 210 execute low level machine specific instructions known as machine code. With the world-wide reach of the internet, problems of incompatibility between application programs 215 at the server 205 and the client computer 210 arise. To alleviate the foregoing problem, a program known as a browser 420 is used at the client computer 210. The browser 420 is a program which executes application programs, such as application program 215, written in a high-level programming language. Therefore, the application program 215 need only be written in a high-level programming language, such as Java, which is universally enabled by browser 420.

The browser 420 also assists in transmitting the histograms from the client computer 210 to the server 205. The client/server connection is established by providing the browser with an address for server 205 in accordance with a predetermined addressing scheme and communication protocol. The browser 420 forwards the histogram record by encapsulating it as an object and forwarding the object to the application program 215.

Additionally, it is desirable to provide a user interface program 425 between the user and the

spectrophotometer 405. The user interface program 425 prompts the user to apply the sample 402 to the spectrophotometer 405. After applying the sample 402, the user can indicate through the user interface 425 that the sample 402 is ready to be evaluated. Responsive to the user's indication, the user interface program 425 causes the spectrophotometer 405 to evaluate the sample 402. The user interface program 425 can be configured as a plug-in program. The plug-in program is a program which interacts with and is invoked by the browser 420.

Storage of the records at database 220 is advantageous for several reasons. One advantage is that sellers and buyers seeking to buy or sell a particular coloring substance or colored product, can easily locate each other, by viewing the histogram records in the database 220. A seller seeking to sell a coloring substance or colored product can simply scan a sample 402 with the color using the spectrophotometer 405 as described and have a histogram record stored in the database 220, as well as contact information, and quantity of supply on hand for review by potential buyers. Wherein the seller seeks to sell a coloring substance, the application program 215 can create histogram records describing any number of colors formed by applying known concentrations of the coloring substance to known substrates. In the same manner, a buyer seeking to buy

a coloring substance or colored product can simply scan a sample 402 with the color using the spectrophotometer 405 and have a histogram record stored in the database 220, with contact information, and quantity needed for review by potential sellers. Once the buyer or seller scans a sample 402, the application program 215 can facilitate a search of the histogram records in the database 220 of either a buyer seeking to purchase a similar such coloring substance or colored product within a reasonable threshold or a seller who can supply a similar coloring substance or colored product. The application program 215 searches the database 220 by using the color's color space parameters as a database query parameter.

Another key advantage is that recipes for coloring substances using the histogram records in database 220 can be calculated to produce the particular coloring substances, within a certain threshold, that are sought by buyers. The greater number of reactants permit a greater number of recipes that can approximate a particular sought coloring substance. For example, a colored products manufacturer, such as a fabric dyer 102 can simply scan a fabric sample 402 with the coloring substance that is sought with the spectrophotometer 405 and forward the histogram record to the application program 215. The application program 215 can review the histogram records in the database 220 to

devise a recipe that results in a coloring substance that matches the coloring substance on the sample 402 within a predetermined threshold. Various parameters can be set by the fabric dyer 102, such as limits on the number of coloring substances, quantity of a particular coloring substance, price, inclusion of a particular coloring substance, and exclusion of a particular coloring substance, to name a few. The application program 215 can then act as a search engine which devises the recipes for the fabric dyer 102. In the seller's case, a dyestuff warehouse 101 who finds a fabric dyer 102 in search of a certain color match can have the application program 215 calculate a recipe for the required coloring substances among the coloring substances in the dyestuff warehouse's 101 inventory. The dyestuff warehouse 101 can then create the product coloring substance and sell the coloring substance to the fabric dyer 102.

The centralized nature of the server 205 and application program 215 provide further benefits for recipe calculation. The application program 215 can be configured such that recipe prediction for a particular set of coloring substances and substrate is also based on the actual results obtained from earlier recipes involving some of the coloring substances in the set of coloring substances or the substrate. The actual results of the earlier recipe can be

obtained by having the user scan a sample 402 of the resulting coloring substance or colored product with the spectrophotometer 405. A histogram record representative of the resulting coloring substance or colored product can also be stored in the database 220.

In a centralized server 205 environment where many users are using the same prediction functionality resources, e.g., the application program 215 and database 220, the actual resulting coloring substances or colored product data or correction coefficients derived from that data can be passed from one user who has already used a particular set of coloring substances and substrates to a second user who is commencing use of any or all of the set of coloring substances or substrate. The application program 215 can then use the foregoing data to calculate a more accurate recipe for the second user.

Referring now to FIGURE 6, there is illustrated a block diagram of color exchange system 100 configured to facilitate the sale and purchase of coloring substances and colored products. Members of the colored product supply chain 101, 102, 103, 104 register with the color exchange 100 and provide a member information file to the color exchange 100 which is stored in the merchant database 605. The member information file comprises various identification and financial information regarding the member. The color

exchange 100 also includes a messaging system 610, application program 215 and a transaction database 615.

When a buyer finds a potential seller, or vice versa, the buyer/seller can communicate to each other by transmitting electronic messages using messaging system 610, such as email, to one another using the contact information provided in the database 220 storing the color space. The server 205 can facilitate transmission of the electronic messaging by acting as an email server. When the buyer and seller agree on a sale of a particular coloring substance, the buyer and seller can record the details of the transaction in the transaction database 615. After the agreement, the buyer can make a payment for the purchase by use of an electronic payment system, such as a credit card or debit card. The credit/debit card account or information can be retrieved from the merchant database 605 by the application program 215, or alternately, provided by the buyer at the time of the transaction.

The color exchange 100 validates the buyer's credit or funds available by requesting a credit for the sale price over a data link to a clearinghouse 620 associated with the buyer's financial institution. If the buyer's institution 620 refuses to issue the credit, the transaction is aborted by the color exchange 100 and both the buyer and seller are so notified. Alternatively, the buyer can arrange to wire

transfer the funds from a bank account to a bank account 625 associated with the color exchange 100. The color exchange 100 is also connected via data link to the bank account 625 associated therewith.

Issuance of the credit by the buyer's financial institution 620 or receipt of the buyer's funds in the bank account 625 associated with the color exchange 100 is electronically confirmed over the data link. When the buyer's funds are received, the color exchange 100 notifies the seller and requests the seller to commence delivery of the goods. When the seller provides proof that the goods have been placed in delivery in accordance with the terms of the transaction, the color exchange 100 releases the funds as payment to the seller. The proof required from the seller can include, for example, a bill of lading. Alternatively, the buyer and seller can agree to alternate terms such as freight on board, etc., which are recorded in the transaction database 615. In such cases, the seller must provide the proof of delivery as detailed in the sale contract in the transaction database 615.

The proof of delivery is provided by a direct data link with couriers 630 and shippers 635. Upon delivery of the seller to the courier 630 or shipper 635, the courier/shipper electronically transmit the appropriate

proof of delivery. Responsive thereto, the color exchange releases the funds for payment to the seller.

Additionally, the color exchange 100 can facilitate the purchase of insurance for insuring the delivery of the coloring substances. The color exchange 100 can provide links to various insurers 640 wherein the parties can purchase insurance. As a revenue source, the color exchange 100 can either receive a commission on the each transaction insured or charge a flat advertising fee to each of the insurers 640.

Referring now to FIGURE 7, there is illustrated a flow diagram describing the operation of the color exchange 100 during an exemplary coloring substance transaction. At step 705, the color exchange 100 receives information indicating the coloring substances or colored products in the inventories of any number of sellers. At step 710, the color exchange 100 receives information regarding a coloring substance or colored products a buyer seeks to purchase. At step 715, a buyer and any number of sellers are paired by the color exchange 100, wherein the sellers are able to provide the colored product or coloring substances which produce the coloring substance sought by the buyer. The foregoing can occur in a number of ways. For example, a buyer reviewing the database 220 can find seller(s), or vice versa. Alternatively, where the buyer seeks a coloring

substance, the buyer can use the application program 215 to generate a recipe, and such recipe includes the seller(s) coloring substances. In another example where the buyer seeks a coloring substance, a seller can use the application program 215 to generate the recipe and notify the buyer. At step 720, the buyer and seller attempt to negotiate a transaction. If the negotiations are unsuccessful, no transaction results and no further action is taken by the color exchange 100.

If the negotiation during step 720 are successful, a record of the transaction is received by the color exchange 100 and stored in the transaction database 615 (step 725). At step 725, the color exchange 100 allows the buyer a predetermined amount of time to provide the funds to the color exchange 100. If the buyer fails to provide the funds within the predetermined amount of time, the color exchange 100 aborts the transaction and notifies both parties (step 730) and takes no further action.

Upon receipt of buyer's funds at the color exchange during step 725, the color exchange 100 notifies the seller to commence delivery (step 735). The seller is allowed a predetermined amount of time to provide proof of delivery in accordance with the terms of the transaction (step 740). If the seller fails to provide such proof within the predetermined amount of time, the color exchange 100 aborts

the transaction (step 745) and returns the funds to the buyer (step 750). If the seller provides such proof in accordance with the terms of the transaction during the predetermined period of time, the color exchange 100 releases (step 755) the buyer's funds to the seller as payment, thereby completing the transaction.

CLAIMS:

1. A color exchange for selling goods, said color exchange comprising:

a server for receiving color information regarding at least one good over a first client/server connection connecting the server to a first client computer associated with at least one seller and for receiving color information regarding a sought good over a second client/server connection connecting the server to a second client computer associated with a buyer; and

a computer readable medium at the server for storing a plurality of executable instructions, said executable instructions comprising means for converting the color information regarding the at least one good into at least one point in a color space.

2. The color exchange of claim 1, said color exchange further comprising a database at the server for storing the color information, wherein the color information is indexed with the at least one point in the color space.

3. The color exchange of claim 1, wherein the plurality of executable instructions are executable by a browser program at the first client computer and the second client computer.

4. The color exchange of claim 3, wherein the plurality of instructions are simultaneously executable at the first client computer and at the second client computer.

5. The color exchange of claim 1 wherein the plurality of executable instructions further comprises means for determining a target point in a color space corresponding to the color information of the sought good.

6. The color exchange of claim 5, wherein the plurality of executable instructions further comprises means for finding the at least one seller from a plurality of sellers, wherein the color information for the at least one good received from the client associated with the seller is converted to at least one point in the color universe within a predetermined threshold of the target point.

7. The color exchange of claim 5, wherein the goods comprise coloring substances, wherein the computer readable medium further comprises means for finding the at least one seller from a plurality of sellers, and wherein the color information for the at least one good received from the client associated with the at least one seller is converted to a plurality of points in the color universe which correspond to a plurality of coloring substances which produce the sought coloring substance.

8. A method for selling goods, said method comprising:

receiving color information regarding at least one good from at least one seller;

receiving color information regarding a sought good from a buyer; and

pairing the buyer and the at least one seller, wherein the coloring information of the at least one good

from the at least one seller is similar to the color information of the sought good.

9. The method of claim 8, wherein receiving information regarding at least one coloring substance from the at least one seller comprises receiving a plurality of wavelength reflection measurements corresponding to the coloring substance associated with a corresponding plurality of wavelengths.

10. The method of claim 9, wherein receiving information regarding at least one coloring substance from the at least one seller comprises converting the plurality of wavelength reflection measurements associated with the plurality of wavelengths into at least one point in a color space.

11. The method of claim 10, wherein receiving information regarding a sought coloring substance from the buyer further comprises determining a target point in a color space describing the color information regarding the sought good.

12. The method of claim 11, wherein pairing the buyer and the at least one seller comprises finding the at least

one seller from a plurality of sellers, wherein the coloring information regarding the at least one good from the at least one seller is converted to at least one point within a predetermined threshold of the target point.

13. The method of claim 11, wherein the goods comprise coloring substances, and wherein pairing the buyer and the at least one seller comprises finding the at least one seller from a plurality of seller, wherein the coloring information regarding the at least one good from the at least one seller are converted to a plurality of points within the color space, wherein the plurality of points which correspond to a plurality of coloring substances which produce the sought coloring substance.

14. The method of claim 8, further comprising receiving a transaction agreement from the buyer or the at least one seller, said transaction agreement comprising a transaction price and required proof of delivery.

15. The method of claim 14, comprising receiving funds equivalent to the transaction price from the buyer.

16. The method of claim 15, comprising:

receiving proof of delivery from the seller; and

transferring the buyer's funds to the seller, responsive to receiving proof of delivery from the seller.

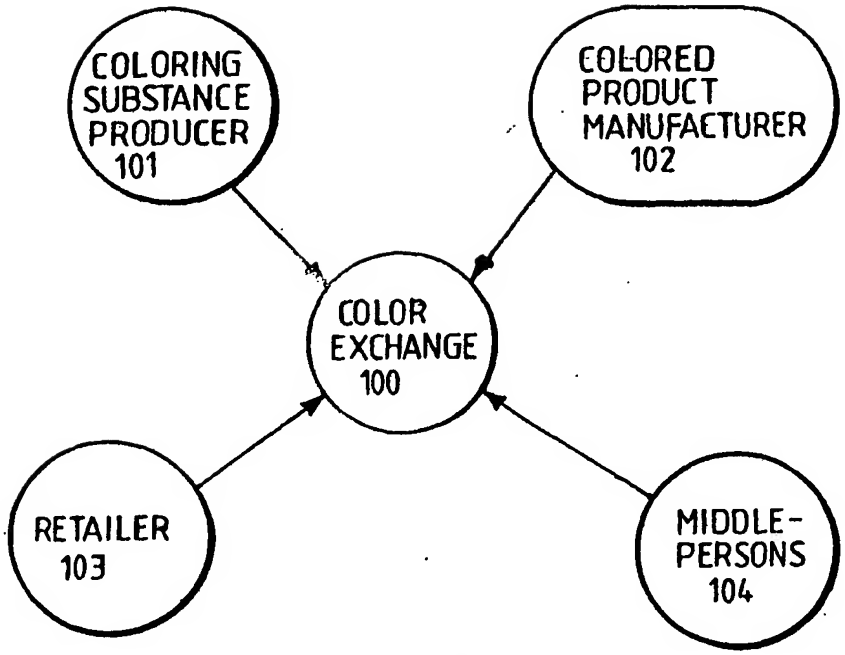
COLORING SUBSTANCE PRODUCER 101
COLORED PRODUCT MANUFACTURER 102
COLOR EXCHANGE 100
RETAILER 103
MIDDLE-PERSONS 104

Fig.1.

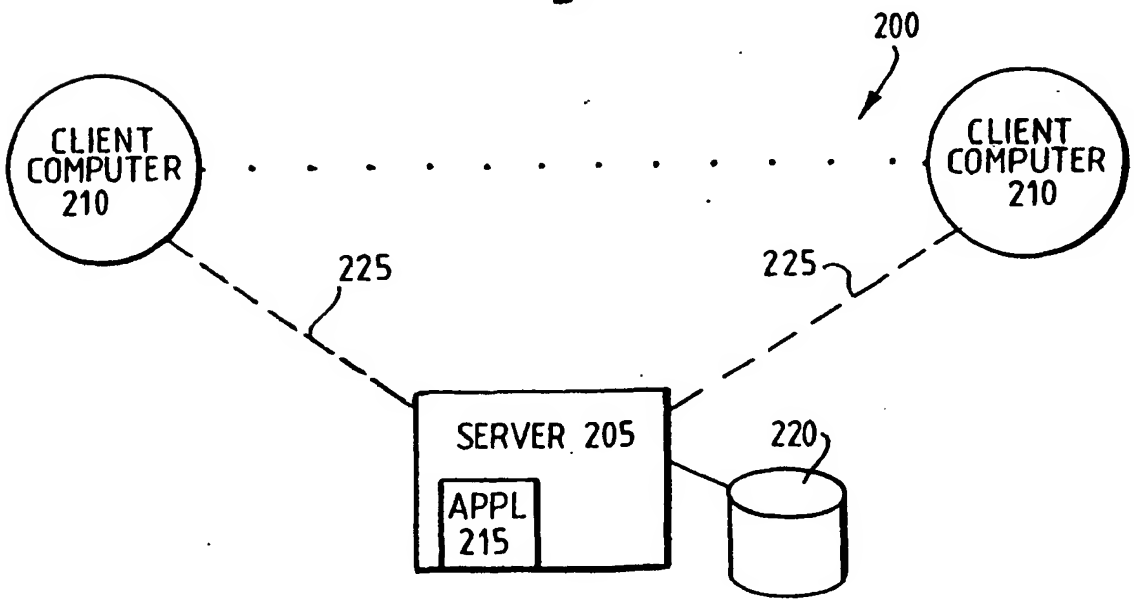
200
CLIENT COMPUTER 210
CLIENT COMPUTER 210
225
225
SERVER 205
APPL 215
220

Fig.2.

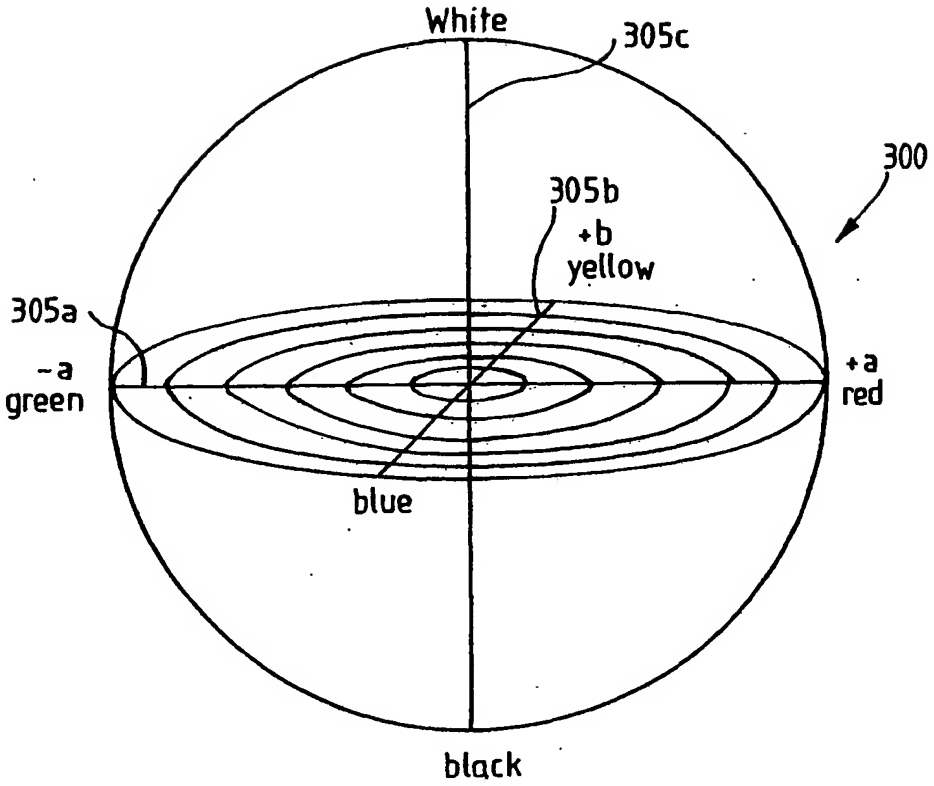
White
305c
300
305b
+b
yellow
305a
-a
green
+a
red
blue
black

Fig.3.

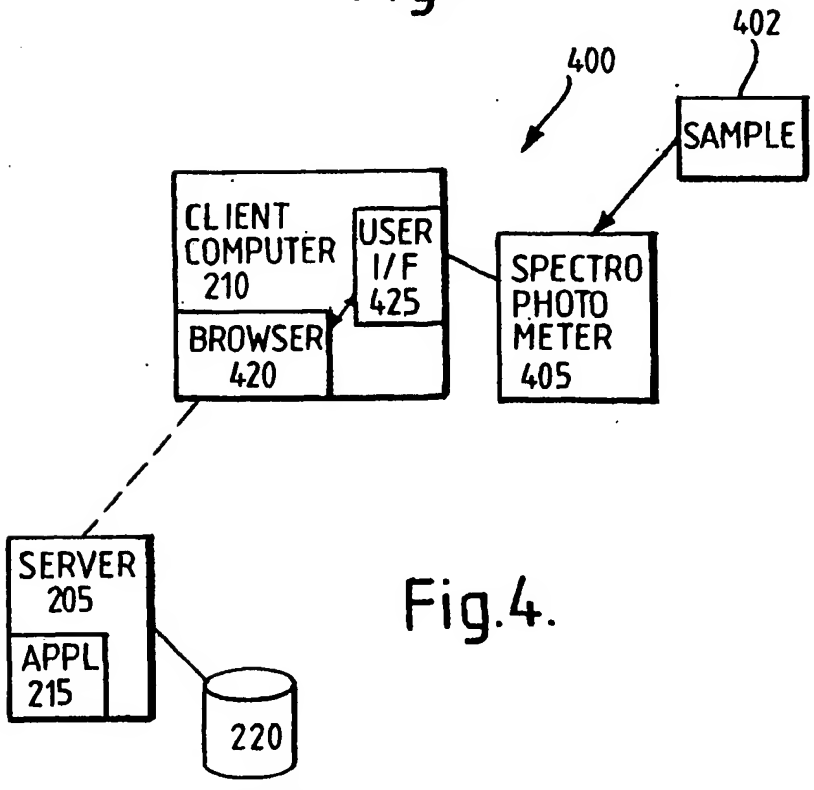
402
400
SAMPLE
CLIENT
COMPUTER
210
USER
I/F
425
BROWSER
420
SPECTRO
PHOTO
METER
405
SERVER
205
APPL
215
220

Fig.4.

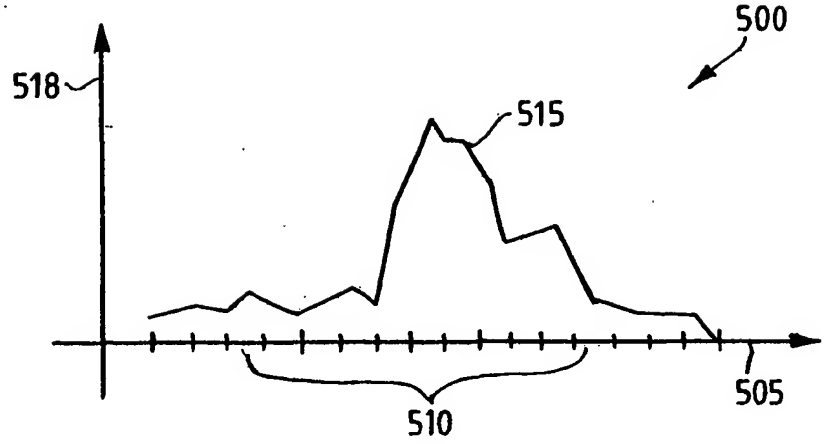
500
518
515
505
510

Fig.5.

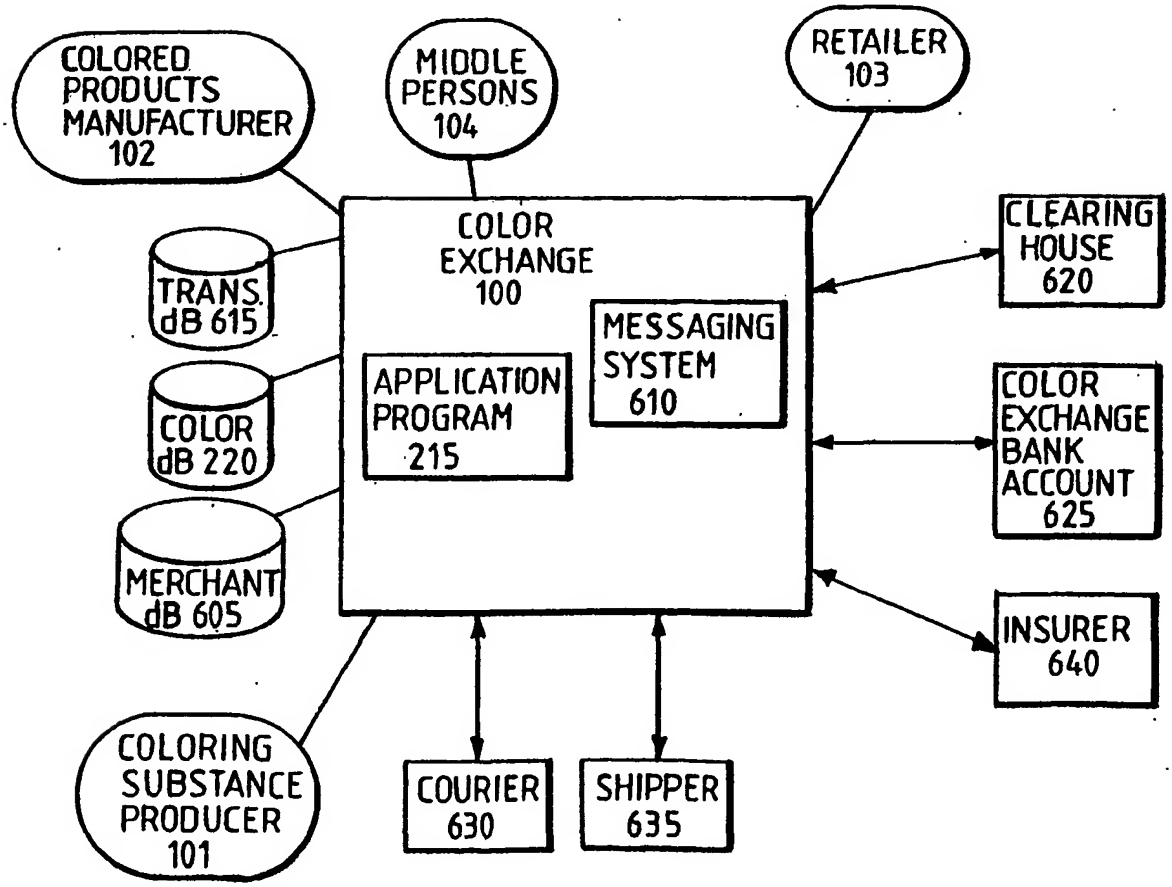
COLORED PRODUCTS MANUFACTURER 102
MIDDLE PERSONS 104
RETAILER 103
COLOR EXCHANGE 100
TRANS. dB 615
COLOR dB 220
MERCHANT dB 605
APPLICATION PROGRAM 215
MESSAGING SYSTEM 610
CLEARING HOUSE 620
COLOR EXCHANGE BANK ACCOUNT 625
INSURER 640
COLORING SUBSTANCE PRODUCER 101
COURIER 630
SHIPPER 635

Fig.6.

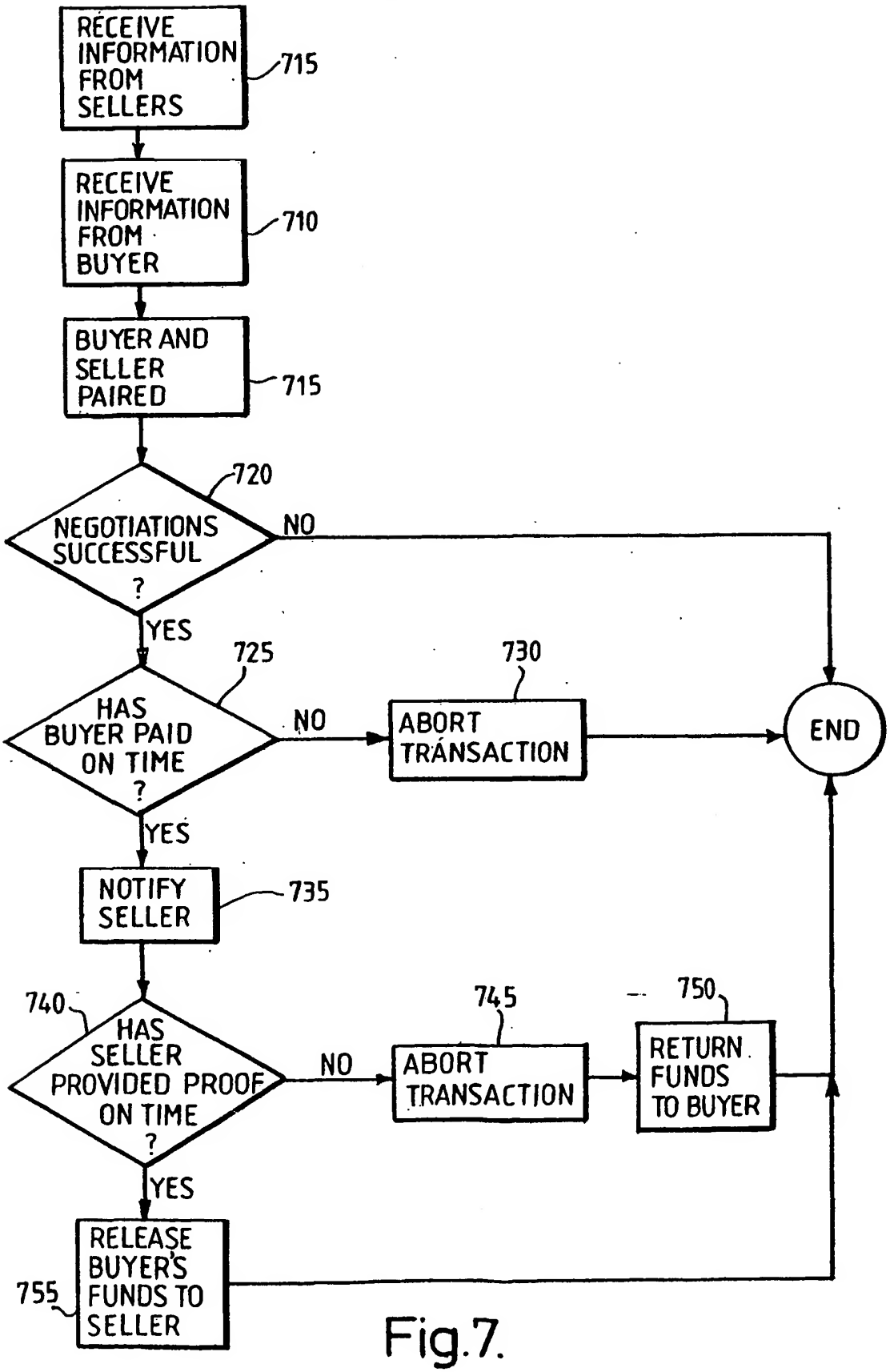
RECEIVE INFORMATION FROM SELLERS
715
RECEIVE INFORMATION FROM BUYER
710
BUYER AND SELLER PAIRED
715
720
NEGOTIATIONS SUCCESSFUL ?
NO
YES
725
HAS BUYER PAID ON TIME ?
NO
730
ABORT TRANSACTION
END
YES
NOTIFY SELLER
735
740
HAS SELLER PROVIDED PROOF ON TIME ?
NO
745
ABORT TRANSACTION
750
RETURN FUNDS TO BUYER
YES
RELEASE BUYER'S FUNDS TO SELLER
755

Fig.7.